

fold is short, the upper palatal fold is similar but smaller. The basal fold is very small or wanting.

G. clappi ranges from southwestern Virginia to central Kentucky, south to northern Alabama and Georgia. It has been found associated with *G. armifera* at the following localities: Kentucky: Edmonson Co.: cedar woods, Turnhole Sink, Mammoth Cave National Park (fig. 2). Tennessee: Moore Co.: cedar woods, 2.5 miles southwest of Lynchburg. Georgia: Dade Co.: roadside, 3 miles southwest of Wildwood.

NEW GASTROPODS FROM THE PLEISTOCENE OF ILLINOIS

BY A. BYRON LEONARD
The Illinois State Geological Survey
Urbana, Illinois 61801

In the course of studies of the molluscan faunas recovered from sediments of Kansan age at eight localities and from more than 25 fossiliferous outcrops of Illinoian age in the Pleistocene rocks of Illinois, six kinds of apparently undescribed gastropods were encountered. Formal descriptions of these mollusks follow.

Types and paratypes of these gastropods are catalogued in the Palaeontological Collections of the Illinois State Geological Survey, except for suites of paratypes deposited with the Academy of Natural Sciences of Philadelphia.

Vertigo occulta, new species

Fig. 8

Diagnosis: A small species of *Vertigo*, ovate-cylindrical in shape, similar to *Vertigo nylanderi* and to *V. briarensis* from both of which it differs in important details, principally with respect to the placement of the lower palatal fold.

Type locality: Long Lake Section, Banner Formation, in humic-stained silts of Kansan age, situated in the Cen. NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 18, T.2 N, R 2 E, Schuyler County, Illinois.

Description of holotype: An ovate-cylindrical shell of five obliquely striate whorls; suture deeply impressed; aperture small, occupying less than one-third the total length of shell; peristome slightly everted and somewhat thickened, with furrow behind; outer lip of peristome sharply indented at middle, forming clearly marked sinulus; denticles six: a small, low, elongate angular, about one-third the length of parietal, the latter elongate, heavy, deeply

entering, and inclined above toward angular; small, nodular, columellar lamella, not ascending inwardly; basal fold small, nodular, subcolumellar in position; palatal folds elongate, elevated and thin, the upper fold deeply entering from the angle of the sinulus, and marked by a deeply impressed furrow without; lower palatal thin, elevated, almost membranous, arising at columella and extending almost at right angles to long axis of shell toward the inner end of the upper palatal fold, where it bends slightly outward. This relation of the two palatals is evident also from their external impressions. Total length of shell, 7.8 mm.; diameter, 1.0 mm.; diameter of aperture, 0.6 mm., height, 0.5 mm.

Variations and comparisons: The large series of shells obtained from seven Kansan and four early Illinoian localities vary little except that the lower palatal fold is in some examples higher and more membranous than in the holotype.

Vertigo occulta differs from *V. nylanderi* in that it is more robust; the angular lamella is less deeply entering; the columellar lamella does not ascend inwardly; and conspicuously by the placement of the lower palatal fold, that is deeply situated within the aperture, almost at right angles to the upper palatal. In *V. briarensis* the angular lamella is wanting, the basal fold is extremely reduced or wanting; and the lower palatal fold is more rugged, less deeply immersed within the aperture, and subparallel to the upper palatal fold.

***Vertigo briarensis*, new species**

Fig. 9

Diagnosis: *Vertigo briarensis* is small, the ovate-cylindrical shell being always less than two millimeters in length, and having five well-rounded whorls. It is similar to *V. occulta*, from which it seems to have been derived.

Type locality: Briar Bluff South Section, in Petersburg Silts of Illinoian age, in the SW corner NW $\frac{1}{4}$ sec. 21, T 1 N, R 1 E, Henry County, Illinois.

Description of holotype: Shell ovate-cylindrical, having five obliquely and finely striate whorls; suture deeply impressed; aperture less than one-third total length of shell; peristome only slightly everted, not thickened, and only vaguely indented, forming an indistinctly outlined sinulus; denticles: an elongate elevated parietal fold, deeply entering the aperture; a nodulose columella lamella; and two palatal folds, deeply situated within the aperture, the lower

more so, and sub-parallel to the upper. Total length of shell, 1.75 mm.; diameter, 1.0 mm.; diameter of aperture, 0.5 mm., height of aperture, 0.5 mm.

Variations and comparisons: Unlike *V. occulta*, *V. briarensis* has not been recovered from Pleistocene deposits of Kansan age, but it is widely distributed both geographically and stratigraphically in deposits within the various substages of the Illinoian Stage. Shells from eight localities are remarkably uniform, although there is slight variation in size. None of the examples seems to intergrade with *V. occulta* although they overlap stratigraphically, and *V. briarensis* replaces *V. occulta* in deposits younger than early Illinoian.

Vertigo briarensis differs from *V. occulta* in that the angular lamella is wanting and the basal almost so; the sinulus is poorly defined; the palatal folds are both less developed and the lower is subparallel to the upper, rather than being almost at right angles to it.

Gastrocopta venusta, *new species*

Fig. 7

Diagnosis: Shell small, less than two millimeters in length, having five moderately inflated whorls, suture well-impressed; surface sculpture granulate, except last two whorls both granulate and obscurely striate; shell somewhat similar to *Gastrocopta holzingeri agna* (Pilsbry and Vanatta) and *G. falcis* Leonard, but differing from both in important details.

Type locality: Wildcat Creek Section, Petersburg Silt Formation of Illinoian age, in the NE¹/₄ NE¹/₄ NE¹/₄ sec. 19, T 13 N, R 4 W, Mercer County, Illinois.

Description of holotype: Shell small for the genus, having five moderately inflated whorls; structure deeply impressed; first three whorls having granulate sculpture; the last two whorls having granulate surface overlain with faint striae; aperture small, narrowly ovate, less than one third height of shell; peristome thin and sharp, but with heavy crest behind; denticles 7: A fused anguloparietal as in the *immersidens* group, the two forked in front; the angular the more conspicuous in front, extending to the peristome, the fused denticle is high, strong, sinuous and deeply entering; the columellar lamella arises deeply within the aperture on the columella, rapidly increases in height, and extending almost to the parietal before decreasing in height and extending to the outer edge of the peristome; the basal fold is broad in front and situated on the

callus that bears the palatal folds, it narrows and increases in height inwardly; the lower palatal fold is broad where it arises from the callus but it narrows inwardly; the upper palatal fold is much smaller, narrower and shorter than the lower; a small granular suprapalatal fold is invariably present. Total length of shell, 1.75 mm.; diameter, 0.95 mm.; diameter of aperture, 0.55 mm.; height of aperture, 0.5 mm.

Variations and comparisons: *Gastrocopta venusta* was recovered from three localities, one in the Kansan and two Illinoian deposits; in all the three localities yielded only a dozen specimens, among which the only observed variation was a few tenths of millimeters in length. *G. venusta* differs from *G. holzingeri agna* in that: the angular lamella is more conspicuous; the columellar lamella extends to the outer edge of the peristome; the basal and palatal folds are broad below and narrow within; and the aperture is narrower and more triangular.

In *G. falcis* the angulo-parietal fold is broadly forked in front, the columellar lamella does not extend to the outer lip of the peristome, and the suprapalatal fold is high and entering rather than tubercular.

***Armiger exigua*, new species**

Figs. 2, 3

Diagnosis: A minute species of *Armiger*, having two and one-half to three depressed, carinate whorls, that slowly increase in diameter toward the aperture. The nuclear whorl has finely granular sculpture, while the remaining whorls exhibit irregular, subvertical striations and less numerous carinae. There are no spiral striations. The last whorl does not descend toward the aperture, which is roundly ovate in form.

Type locality: Briar Bluff South Section in Petersburg Silts of early Illinoian age, in the SW corner of NW $\frac{1}{4}$ sec. 21, T 17 N, R 1 E, Henry County, Illinois.

Description of holotype: Shell plano-spiral with two and one-half whorls that are flattened somewhat above, rounded below; the periphery is somewhat above the middle of the last whorl which is roundly angular; last whorl not descending toward the aperture; aperture rounded-oval, and narrowly appressed to preceding whorl; spire depressed but not below level of general dorsal surface; umbilicus impressed but revealing all the whorls; nuclear whorl having granular sculpture that extends on to succeeding whorls where they

are overlain by coarse diagonal growth lines which on the last whorl are interspersed with costae, of which there are about 18 on the last whorl; there is no hint of spiral striae. Lip of peristome thin and simple. Greater diameter of shell, 1.95 mm.; lesser diameter, 1.67 mm.; height of aperture, 0.7 mm.; width of aperture, 0.6 mm.

Variations and comparisons: Shells vary but little among the 53 paratypes available. The largest shell observed had two and three-fourths whorls, and its greater diameter measured 2.2 mm.

Armiger exigua differs from *A. crista* (Linné) in that it is much smaller, although having the same number of whorls; the nuclear whorl is granulate rather than striate; there is no indication of spiral striae; the last whorl does not descend toward the aperture; and the aperture is roundly oval in shape.

***Succinea exile*, new species**

Fig. 1

Diagnosis: Shell similar in form to *Succinea gelida* Baker but uniformly smaller (total length always less than 5 mm.) more slender in form, and having the aperture narrowly ovate above.

Type locality: Briar Bluff South Section, Petersburg Silts of Illinoian age, in the SW corner NW $\frac{1}{4}$ sec. 21, T 1 N, R 1 E, Henry County, Illinois.

Description of holotype: Shell small for the genus; the three and one-half whorls rounded, the last proportionately small, separated by deeply incised suture; nuclear whorl swollen but smaller (diameter 0.5 mm) with granular sculpture, the remaining whorls having delicate but rather irregular vertical striae; aperture pear-shaped, rounded below, narrowed above; outer lip of peristome not greatly curved inward above; columellar lip rounded below, angled above toward the short callus spread against the parietal wall; aperture length about one half that of shell. Total length of shell, 4.9 mm.; diameter, 2.4 mm.; height of aperture, 2.4 mm., diameter, 1.7 mm.

Variations and comparisons: Among the 42 shells from three Kansan and 4 Illinoian localities there is little variation except that due to difference in age. *Succinea exile* differs from *S. gelida* which it resembles in general form, in being uniformly smaller, and the shell having a more slender form; the aperture is narrower above, and the outer lip does not turn inward above as sharply as it does in *gelida*.

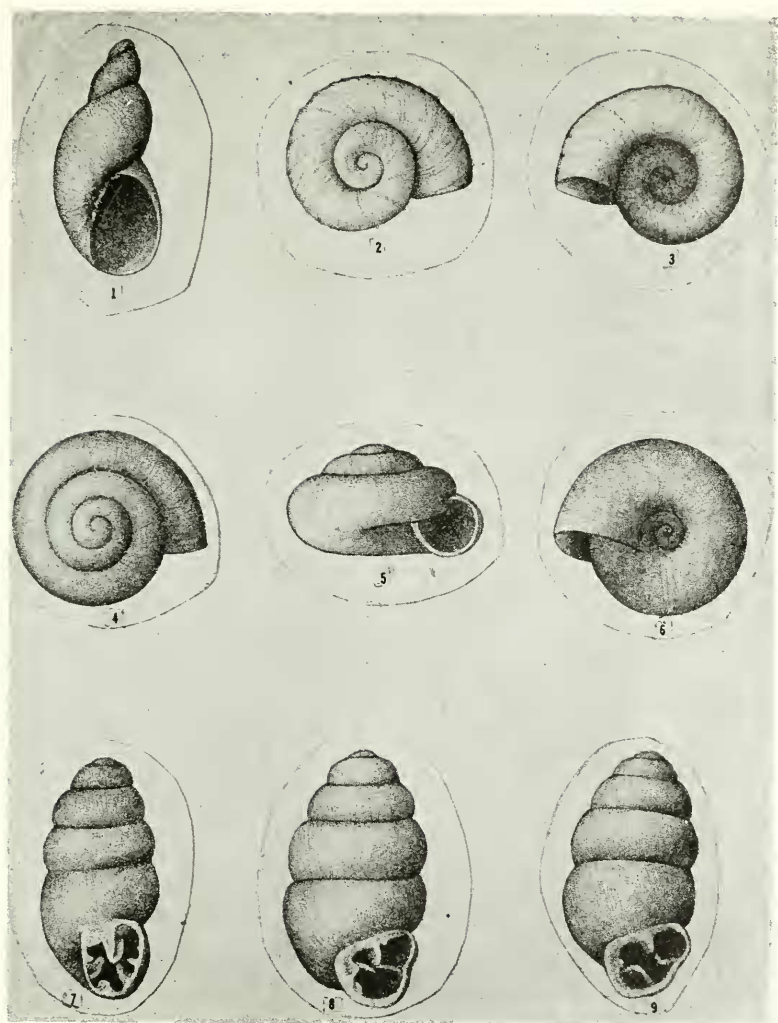


Fig. 1. *Succinea exile* Leonard, holotype; X 6.5. Figs. 2, 3. *Armiger exigua* Leonard, holotype; X 12.5. Spiral and umbilical views, respectively. Figs. 4, 5, 6. *Punctum parvulum* Leonard, holotype; X 18.8. Spiral, apertural and umbilical views, respectively. Fig. 7. *Gastrocopta venusta* Leonard, holotype; X 18. Fig. 8. *Vertigo occulta* Leonard, holotype; X 19. Fig. 9. *Vertigo briarensis* Leonard, holotype; X 19.

Punctum parvulum, *new species*

Figs. 4, 5, 6

Diagnosis: A minute, depressed, conoid, spiral shell, similar to *Punctum minutissimum* (Lea) which it most resembles, but differing in being smaller in size and having a lesser number of whorls, lacking spiral striae, and having a much narrower umbilicus.

Type locality: Long Lake Section, in silts of the Banner Formation of Kansan age, situated in the center of NW¹/₄ NW¹/₄ sec 18, T 2 N, R 2 E, Schuyler County, Illinois.

Description of holotype: Shell small, depressed, conoid, whorls three and one-half, rounded; suture moderately impressed; aperture lunate, peristome thin, simple; nuclear one and one-third whorls granular, the granular sculpture extending onto the remaining whorls where it is overlain by extremely delicate vertical striae, not apparent without strong magnification; no indication of spiral lines either above or below; umbilicus very narrow, its diameter no more than one-sixth that of the shell. Diameter of shell, 1.3 mm.; height, 0.7 mm.; height of aperture, 0.5 mm., diameter, 0.5 mm.; diameter of umbilicus, 0.22 mm.

Variations and comparisons: The 95 shells from seven Kansan and two Illinoian localities are remarkably uniform except for age variations. *P. parvulum* differs from *P. minutissimum* in that it is slightly smaller and with fewer whorls; the nucleus is granular rather than smooth; the striae are more delicate; spiral striae are lacking, and the umbilicus is much narrower.

**OBSERVATIONS ON THE GASTROPOD,
CHARONIA VARIEGATA, IN TRINIDAD AND TOBAGO**

BY PETER L. PERCHARDE
Trinmar Limited, Point Fortin,
Trinidad and Tobago

When the author came to Trinidad in 1958, underwater observations soon revealed that *Charonia variegata* was fairly common in these waters. Many specimens have since been observed underwater in their habitat, and observation on their feeding habits reveals that they are voracious predators.

FORMS AND HABITAT

Like the shells of many other species of tropical gastropods, *Charonia variegata* presents two separate morphological forms. The shallow water, coral reef form is characterized by the denser calcar-